Degree of Bachelor of Science (Honours) in Built Environment Studies
Faculty for the Built Environment
Course Programme

Objectives

1.0 The Course Programme is designed to

(a) offer as much choice to students as resources allow, and the least number of mandatory study-units as can be managed;
(b) allow as late as possible a decision about which second tier Masters a particular candidate wishes to eventually follow, to ensure that they have become aware of the range of possibilities, and also of their own aptitudes, before they make a choice.;
(c) allow for the possibility that candidates stop after the first tier qualification.

2.0 The Programme will consist of study-units, grouped under generic headings, including History and Theory Studies, Heritage Conservation, Construction Technology, Materials, Environmental Design, Structural Engineering, Geotechnical Engineering, Spatial Planning, Sustainable Development, Water and Mineral Resources, Road Transport, Landscape Design, Construction Management and Law, Visual Arts, Mathematics and Computing, which will be taught via formal lectures/seminars, and, most importantly, via Design Workshops.

3.0 Each semester will include a series of practical, and thematic, design exercises, which will, in general, be carried out in a studio, or workshop, environment. The design workshops of each semester will carry a credit value of 6 ECTS, on the assumption that formal contact time with workshop tutors will not be less than 42hrs per semester per student. This will obviously need to be supplemented by considerable private or group work, generally in a studio environment. In order to ensure that the formal contact time is meaningful, it is necessary for the number of students in each workshop to be limited to ca. 30 students. For this purpose, therefore, in each semester, a number of parallel workshop sessions will be held, each led by one or two tutors.

4.0 Taught study-units will be of 3 or 4 ECTS rating, corresponding to 21 or 28 formal contact time (lecturing), not including tutorials, site visits, practical sessions and laboratory work, as is appropriate for the respective study-unit. In order to address as wide a spectrum of issues as possible, the study-units of the first semester will be of 3 ECTS rating, whilst in the second semester, there will be three study-units of 4 ECTS
rating, and four study-units of 3 ECTS rating. From second year onwards, taught study-units will generally all be of 4 ECTS rating.

5.0 It is intended that the study-units of the first three semesters will be mandatory for all students, but that, in the last three semesters would be offered an increasing number of “targeted” electives. The study-units of the first three semesters aim at emphasizing the basic common concerns of all disciplines, within the built environment, namely the impact of all that is built, on, firstly, the natural environment and natural landscape, and, secondly, on the social (the community) and cultural fabric (the built heritage), and the importance of resource and energy efficiency in the building process. At the same time, students will be offered an introduction to the linkages between forms of construction, structure, material science, and fabric performance, in order to create the basis for a sound technological preparation.

6.0 In the second half of the course, students will be offered a wider range of electives. The selection of study-units, however, will not be without guidance, (unless a candidate wishes to follow a route other than the professional Masters degree). It is envisaged that each professional masters degree will identify, as pre-requisite to admission, a preferred road-map, which identifies the minimum range of disciplines that have to be successfully followed. The study-units, offered in the second half of the course, are grouped in themes, and students will be required to obtain established amounts of credits, from each theme, as required by the respective Masters degree programme. Ideally, students will find choice, even within the same theme, so that the possibilities of study are widened beyond the limitations of a completely mandatory programme, within as efficient use of resources as possible.
The following Programme is offered:

**YEAR ONE.**

**Semester 1**
*(All study-units mandatory)*

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEN1101</td>
<td>Design Workshop 1</td>
<td>6</td>
</tr>
<tr>
<td>AUD1201</td>
<td>History and Theory Studies 1 (Modern Movements)</td>
<td>3</td>
</tr>
<tr>
<td>CNM1401</td>
<td>Introduction to Forms of Construction</td>
<td>3</td>
</tr>
<tr>
<td>CNM1421</td>
<td>Materials and the Environment</td>
<td>3</td>
</tr>
<tr>
<td>EVD1501</td>
<td>Fundamentals of Environmental Science</td>
<td>3</td>
</tr>
<tr>
<td>CVE1611</td>
<td>Introduction to Structure Systems</td>
<td>3</td>
</tr>
<tr>
<td>SPI1711</td>
<td>Landscape and Human Impact</td>
<td>3</td>
</tr>
<tr>
<td>SPI1721</td>
<td>Introduction to Sustainable Development</td>
<td>3</td>
</tr>
<tr>
<td>MAT1801</td>
<td>Mathematics for Engineers 1</td>
<td>4</td>
</tr>
</tbody>
</table>

**Semester 2**
*(All study-units mandatory)*

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEN1102</td>
<td>Design Workshop 2</td>
<td>6</td>
</tr>
<tr>
<td>AUD1202</td>
<td>History and Theory Studies (19th cent)</td>
<td>3</td>
</tr>
<tr>
<td>BLH 1301</td>
<td>Our Heritage and Us</td>
<td>3</td>
</tr>
<tr>
<td>MME1203</td>
<td>Introduction to Material Science</td>
<td>3</td>
</tr>
<tr>
<td>CVE1632</td>
<td>Introduction to Data Management</td>
<td>3</td>
</tr>
<tr>
<td>EVD1502</td>
<td>Environmental Design of Interior Spaces</td>
<td>4</td>
</tr>
<tr>
<td>CNM1412</td>
<td>Building Elements 1</td>
<td>4</td>
</tr>
<tr>
<td>CVE1612</td>
<td>Structures 1</td>
<td>4</td>
</tr>
</tbody>
</table>
### YEAR TWO.

#### Semester 1

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEN2101</td>
<td>Design Workshop 3</td>
<td>6</td>
</tr>
<tr>
<td>AUD2211</td>
<td>Studies in Maltese Architecture</td>
<td>4</td>
</tr>
<tr>
<td>CNM2411</td>
<td>Building Elements 2</td>
<td>4</td>
</tr>
<tr>
<td>CNM2421</td>
<td>Materials for Construction 1</td>
<td>4</td>
</tr>
<tr>
<td>EVD2501</td>
<td>Environmental Control Systems</td>
<td>4</td>
</tr>
<tr>
<td>CVE2611</td>
<td>Structural Design 1</td>
<td>4</td>
</tr>
<tr>
<td>CNM2801</td>
<td>Introduction to Project Management</td>
<td>4</td>
</tr>
</tbody>
</table>

### YEAR TWO.

#### Semester 2

*Electives to be selected in accordance with masters programmes*

<table>
<thead>
<tr>
<th>Design Workshops – to select total of 6 ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUD2101 Digital Design Workshop</td>
</tr>
<tr>
<td>AUD2102 Housing Design Workshop</td>
</tr>
<tr>
<td>CSE2101 Designing in Stone</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Historical Studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUD2212 The Architecture of the Ancient World</td>
</tr>
<tr>
<td>AUD2213 History of European Art and Culture</td>
</tr>
<tr>
<td>CSE2211 History of Construction Technology</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Architectural/Design Theory</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUD2221 Theory of Digital Design</td>
</tr>
<tr>
<td>AUD2222 Space and Visual Perception</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Conservation and Heritage Studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>BLH2301 Introduction to Conservation Studies</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Construction Technology Studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>CNM2412 Masonry Construction and Detailing</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Materials in Construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>MME2421 Materials for Construction 2</td>
</tr>
</tbody>
</table>
50 Environmental Science
EVD2502 Energy Efficient Design 4 ECTS

61 Structural Behaviour and Design
CSE2612 Structural Design 2 4 ECTS

62 Geotechnical and Foundation Studies
CSE2621 Introduction to Geotechnical Engineering 4 ECTS

63 Mathematics and Computing Studies
CSE2631 Numerical Analysis with Mathlab 4 ECTS

71 Urban Design Studies
SPI2711 Introduction to Urban Design Studies 4 ECTS

72 Spatial Planning Studies
SPI2721 Introduction to Spatial Planning 4 ECTS

73 Infrastructural Systems and Development
SPI2731 Hydrology and Water Resources 4 ECTS
SPI2732 Introduction to Road Transport 4 ECTS

74 Landscape Studies
SPI2741 Principles of Landscape Science 4 ECTS

80 Management Studies
CNM2802 Introduction to Construction Management 4 ECTS

90 Visual Arts
VSA2901 Advanced Line Drawing 4 ECTS
VSA2902 Understanding Disciplines of Fine Art 4 ECTS
### YEAR THREE.

*Electives to be selected in accordance with masters programmes*

#### Semester 1

**10 Design Workshops** – to select total of 6 ECTS
- AUD3101  Themed Design Workshop  3 ECTS
- CNM3101  Themed Design Workshop  3 ECTS
- EVD3101  Themed Design Workshop  3 ECTS
- CVE3101  Themed Design Workshop  3 ECTS

**21 Historical Studies**
- AUD3211  The Architecture of Medieval Europe  4 ECTS
- BLH3211  History of Cities and Gardens  4 ECTS

**22 Architectural/Design Theory**
- AUD3221  Digital Design 1- 2D  4 ECTS
- VSA3221  Theory of Aesthetics  4 ECTS

**30 Conservation and Heritage Studies**
- BLH 3301  Philosophy of Conservation  4 ECTS

**41 Construction Technology Studies**
- CNM3411  Concrete Construction Technology  4 ECTS

**42 Materials in Construction**
- CNM3421  Degradation of Building Materials 1 (concrete, timber, stone)  4 ECTS

**50 Environmental Science**
- EVD3501  Advanced Lighting Design  4 ECTS

**61 Structural Behaviour and Design**
- CSE3611  Theory of Structures 1  4 ECTS
- CSE3612  Structural Design 3 (steel)  4 ECTS

**62 Geotechnical and Foundation Studies**
- CSE3621  Geotechnical Engineering 1  4 ECTS
Mathematics and Computing Studies
CSE3631 Mathematics for Engineers 2 4 ECTS

Urban Design Studies
SPI3711 Piazzas, Markets and Other Public Spaces 4 ECTS

Spatial Planning Studies
SPI3721 Spatial Studies 1 – Maltese Planning Systems 4 ECTS

Spatial Planning Studies
SPI3721 Spatial Studies 1 – Maltese Planning Systems 4 ECTS

Infrastructural Systems and Development
SPI3731 Civil Engineering Hydraulics 4 ECTS
SPI3732 Road Infrastructure 1 4 ECTS
SPI3733 Geomatics 1 4 ECTS

Landscape Studies
SPI3741 Landscape Construction Elements 4 ECTS

Management Studies
CNM3801 Contract Administration/Production Management 4 ECTS
CNM3802 Law (Civil, Property, Liability)

Visual Arts
VSA3901 Creative Urban and Landscape Environments 4 ECTS

Semester 2
10 Design Workshops – to select total of 6 ECTS
AUD3102 Themed Design Workshop 3 ECTS
CNM3103 Themed Design Workshop 3 ECTS
EVD3104 Themed Design Workshop 3 ECTS
CVE3105 Themed Design Workshop 3 ECTS

Historical Studies
AUD3212 The Architecture of the Early Modern World 1 4 ECTS
AUD3213 The Architecture of the Early Modern World 2 4 ECTS

Architectural/Design Theory
AUD3222 Digital Design 2 – 3D 4 ECTS
VSA3222 Sound and Architecture 4 ECTS
30 Conservation and Heritage Studies
BLH3302   Heritage and Restoration  4 ECTS

41 Construction Technology Studies
CSE3412   Steel Construction Technology  4 ECTS

42 Materials in Construction
BLH3421   Traditional Building Materials  4 ECTS
MME3421   Degradation of Building Materials  2 4 ECTS

50 Environmental Science
EVD3502   Advanced Acoustic Studies  4 ECTS

61 Structural Behaviour and Design
CSE3613   Theory of Structures  2 4 ECTS

62 Geotechnical and Foundation Studies
CSE3622   Geotechnical Engineering  2 4 ECTS

63 Mathematics and Computing Studies
CSE3632   Mathematics for Computational Design  4 ECTS

71 Urban Design Studies
SPI3712   Urban Regeneration  4 ECTS

72 Spatial Planning Studies
SPI3722   Spatial Studies 2 – Spatial Development  4 ECTS
SPI3723   Geographic Information Systems  4 ECTS

73 Infrastructural Systems and Development
SPI3734   Management of Water and Solid Waste  4 ECTS
SPI3735   Road Infrastructure 2  4 ECTS

74 Landscape Studies
SPI3742   Landscape Technology  4 ECTS
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>CNM3803</td>
<td>Property Management</td>
<td>4</td>
</tr>
<tr>
<td>CNM3804</td>
<td>Value and Risk Management</td>
<td>4</td>
</tr>
<tr>
<td>CNM3804</td>
<td>Law (Environmental and Planning Law)</td>
<td>4</td>
</tr>
<tr>
<td>VSA3902</td>
<td>Semiotics: A User’s Introductory Guide</td>
<td>4</td>
</tr>
</tbody>
</table>

**80 Management Studies**

**90 Visual Arts**
First Semester

Description of Study-Unit

BEN1101  Design Workshop 1  6 ECTS

Study-Unit Aims

Development of Basic Skills in Architectural Representation  Foundations and Application of Descriptive Geometry

Emphasis on two-dimensional representation of three-dimensional forms; development of basic skills in architectural design drawing and modeling

Learning Outcomes

Ability to employ appropriate representational media, including computer technology, to convey essential formal elements of a three-dimensional form, or groups of forms, on two-dimensions

Ability to use drawings to represent three-dimensional forms, by constructing orthographic projections (plans, sections, elevations), perspective, axonometric and other formal methods of representation

Ability to use and understand symbology, texture, and scale on drawings

Ability to represent construction details, using standard styles and nomenclature

Ability to measure up a building or an area of land, and to represent it on a drawing, using standard representation techniques

Teaching and Learning Methods

Studio presentation sessions, studio work, tutorials, project work

Method of Assessment

Portfolio  (with re-presentation of work, if unsatisfactory)

Reading List
Description of Study-Unit

AUD1201  History and Theory Studies 1  3 ECTS

Study-Unit Aims

To introduce the study of history of the built environment, as the story of the development of buildings, and the story of man’s quest for shelter. The first semester will focus on architectural movements which flourished during the twentieth century. The course of lectures will commence from the recent to the most dated movements which arose during the century. For each movement identified, the significant salient characteristics are outlined through the works of architects who are broadly classified to follow the architectural philosophy of a given movement.

The scope of this course is not only to outline the developments of architectural movements over the period covered but also to provide a spectrum of various case studies which best illustrate the architectural rational of particular movement. Consequently, significant number of architects and their main works will be introduced during the course of the lectures.

Learning Outcomes

Ability to identify the different stages of architecture in the prehistorical and classical period

Ability to identify classical rules of design and construction

Teaching and Learning Methods

Lectures and audio-visual presentations

Method of Assessment

Examination  70%  (with re-sit)

Assignments  30%

Reading List

Twentieth Century Architecture: A Visual History, Sharp, D.
Modern Architecture: A Critical History, Frampton, K.
Architecture in the Twentieth Century, Gössel, P.
A History of Western Architecture, Watkin, D.
Description of Study-Unit

CNM1401  Introduction to Forms of Construction  3 ECTS

Study-Unit Aims

To explore concepts, process and systems in construction, and to relate forms to structural and building performance requirements.

To introduce concepts of sustainable construction

Learning Outcomes

Ability to identify the phases of the sequence of building operations

Ability to understand types and forms of construction, including block and slab construction, in-situ and pre-cast construction, formwork and falsework systems, and other components and systems.

Ability to understand the different phases in the consideration of Life-Cycle in the construction process

Ability to assess the life-cycle of a simple building project

Teaching and Learning Methods

Lectures, Site visits, assignments

Method of Assessment

Examination  75%     (with re-sit)
Assignments  25%

Reading List
Description of Study-Unit

CNM1421  Materials and the Environment  3 ECTS

Study-Unit Aims

To introduce students to the impact of material selection, and material sourcing, on the environment

To review construction materials and their environmental performance, including the environmental aspects of the production, use and disposal of materials

To introduce methods and tools for the assessment of material environmental implications in design

Learning Outcomes

Ability to evaluate the environmental impact of renewable and non-renewable material resources

Ability to assess the life cycle of materials, and the significance of end of life, and of re-cycling

Awareness of national and international legislation and standards

Ability to carry out eco-audits for construction materials

Ability to select materials on the basis of material indices, and eco-performance

Teaching and Learning Methods

Lectures, seminars

Method of Assessment

Examination  75%  (with re-sit)
Assignments  25%

Reading List
Description of Study-Unit

EVD1501    Fundamentals of Environmental Science    3 ECTS

Study-Unit Aims

The aim of this study unit is to familiarize students with the basic concepts of environmental design as a response to human needs for a comfortable indoor environment. The significance of the thermo-physical and other properties of building materials and components will be introduced.

The unit will be organized as follows:

1. *Introduction*: The way humans perceive and sense their environment and how they respond to it. The measurement of environmental characteristics.
5. *The Acoustic Environment*: The physical properties of sound. Introduction to room acoustics including the concept of reverberation and reflection of sound. Sound insulation properties of building materials and components

Learning Outcomes

Ability to understand the effect of climate on the thermal environment within and outside buildings;
Ability to understand the way humans respond to the thermal environment and consequently the need for specific descriptors of the thermal environment;
Ability to identify the thermo-physical properties of building components and use appropriate descriptors to assess the suitability of such components in different situations;
Ability to understand the basic concepts for the description of the visual and acoustic environment and get familiar with the main descriptors used to analyze the visual and acoustic environments.

Teaching and Learning Methods

Lectures and practical sessions

Method of Assessment

Examination    75%    (with re-sit)
Assignments    25%

Reading List

*Architecture, Engineering and Environment*, Hawkes, D. & Forster, W., Laurence King Publishing Ltd., 2002
Description of Study-Unit
CVE1611  Introduction to Structure Systems  3 ECTS

Study-Unit Aims
To introduce the objectives of structural design, including concepts of safety, economy and function.
To introduce the relationship between structural action and structural form
To introduce descriptors of structural action, such as bending moment, shear, compression-tension, torsion, buckling.

Learning Outcomes
Ability to identify the type of structural action that particular structural forms facilitate
Ability to understand levels of safety, and the link between safety and economy, and between safety and serviceability
Ability to assess existing buildings and characterize the relative structural action
Ability to calculate simple actions on structures, such as bending moment, shear force.

Teaching and Learning Methods
Lectures, practical model assignments

Method of Assessment
Examination  75%  (with re-sit)
Assignment  25%

Reading List
An Introduction to Design for Civil Engineers, Narayanan, R.S. & Beeby A.W., Spon Press, 2000
Building Structures, from concepts to design, Millais, M., Spon Press, 2005
Developments in Structural Form, Mainstone, R., Architectural Press, 2001
Structure as Architecture, Charleson, A.W., Elsevier, 2005
Description of Study-Unit

SPI1711  Landscape and Human Impact  3 ECTS

Study-Unit Aims

Introduce students to the contribution of disciplines that are concerned with the study of the interaction between human beings and the physical environment.

Introduce local elements of landscape, and geo-morphology, and to understand the impact of human settlements on eco-systems.

Introduce concepts of bio-diversity, and of nature and ecology as basic components of any sustainable spatial development.

Introduce an understanding of the nature of soil, as a scarce asset to be considered in sustainable planning.

Learning Outcomes

Ability to analyze existing ecosystems and landscape systems.

Ability to assess the impact of human settlements on eco-systems.

Ability to assess the manner by which human behavior moulds and is in turn affected by spatial development.

Teaching and Learning Methods

Lectures, site visits and assignments.

Method of Assessment

Examination 75% (with re-sit).

Assignments 25%.

Reading List
Description of Study-Unit

SPI1721 Introduction to Sustainable Development 3 ECTS

Study-Unit Aims

To introduce, at an early stage, a holistic approach towards architectural and engineering solutions, particularly as far as concerns macro-scale issues.

To introduce students to climate change phenomena and their impact, and how interventions can be targeted to achieve carbon neutral solutions.

To introduce sustainable development issues particularly relevant to Malta, including water resources, waste management, and transport.

Learning Outcomes

Ability to analyze sustainable development issues, particularly as contributed to by the building, construction and engineering industry.

Teaching and Learning Methods

Lectures and assignments

Method of Assessment

Examination 75% (with re-sit)

Assignments 25%

Reading List
Description of Study-Unit

MAT1801  Mathematics for Engineers 1  4 ECTS

Study-Unit Aims

The development of differential calculus techniques as a way of describing engineering problems

Learning Outcomes

Ability to create determinable models of physical and engineering phenomena, with appropriate constitutive equations and appropriate boundary conditions, and using calculus as a tool for solving complex problems

Skills

Proficiency in mathematics through differential equations, and calculus-based engineering problems

Teaching and Learning Methods

Lectures and tutorials

Method of Assessment

Examination  (with re-sit)

Reading List
Second Semester

Description of Study-Unit

BEN1102  Design Workshop 2  6 ECTS

Projects: A series of small, short duration projects dealing with specific building spaces or components.

Study-Unit Aims

This study-unit consists of a series of small short duration projects, undertaken in a studio environment, with the following objectives:

Introduction of basic tools in the Design Process, including Site Evaluation, Preparation of a Brief, User Requirements, Ergonomics, Building Typologies.

Application of basic design tools to generate two-dimensional and three-dimensional design compositions

Learning Outcomes

Ability to understand and to accurately represent the spatial and ergonomic requirements of equipment and users of common building components, e.g. bathrooms, changing rooms, kitchens, corridors, staircases, ramps, lifts, parking areas and other service spaces.

Ability to gather all relevant design information, in a clear and systematic manner, to prepare the basis of a valid design concept

Ability to search for cues within the specific context of a design problem, going beyond the first impressions of a site, to develop meaningful design concepts

Skills

Ability to design common building components

Ability to prepare an evaluation of the characteristics of a Site, as relevant to the preparation of a design

Ability to synthesize user requirements, site characteristics, and other issues to prepare design Brief

Ability to apply standard design tools to basic design problems

Teaching and Learning Methods

Studio presentation sessions, studio work, tutorials, project work

Method of Assessment

Portfolio  (with re-presentation if unsatisfactory)

Reading List
Description of Study-Unit

AUD1202  History and Theory Studies 2  3 ECTS

To develop the study of history of the built environment, as the story of the development of buildings, and the story of man’s quest for shelter. The second semester of the History and Theory Studies 2 follows and builds on the course material of History and Theory Studies 1. The focus of the course is still the period 1750 to-date but the emphasis is more on themes, debates and manifestos. These include arts and crafts values, artistic vision, search for form, design ecology, and urban planning. Reference to the following on-going debates will be addressed: functionalism, modernism, post-modernism, regional and vernacular ecological design. Architectural works covered in the first semester will be used to illustrate the various aspects of the evolving theories of architecture, theories grounded in the shifting emphasis of the philosophical approaches to the art and science of building. During the course of these lectures, reference will be made to short selected texts by leading architects and architectural critics, texts which students are encouraged to critically analyse.

Learning Outcomes

Ability to understand the various architectural theories and debates which flourished over the historical period covered by the course, via readings of original writings on architecture;

Ability to critically review architectural case studies.

Teaching and Learning Methods

Lectures and audio-visual presentations

Method of Assessment

Examination  75%  (with re-sit)
Assignments  25%

Reading List

General theoretical reading:

Modern Architecture since 1900, Curtis, W., Phaidon Press Ltd, 1996 ed.

Editions containing selected texts:

Description of Study-Unit

BLH 1301 Our Heritage and Us 3 ECTS

Study-Unit Aims

To introduce students to the impact of development on existing built heritage

To promote an awareness of the variety and richness of the local built heritage, and assessment of values

Learning Outcomes

Ability to understand the different values pertaining to existing built heritage

Ability to identify critical examples of built heritage, and assess the impact of development on the values pertaining to such heritage

Ability to assess case studies where the impact of development on existing built heritage was particularly marked

Teaching and Learning Methods

Lectures and site visits

Method of Assessment

Examination 75% (with re-sit)

Assignments 25%

Reading List
Description of Study-Unit

MME1203  Introduction to Material Science  3 ECTS

Study-Unit Aims

Introduce the fundamentals of materials, including metals, polymers, ceramics and composites.

Introduce the relationship between materials properties, particularly physical and mechanical properties, to material structure

Introduce laboratory techniques of testing for materials properties

Learning Outcomes

Ability to classify materials on the basis of their atomic and molecular structure, and on inter-atomic bond mechanisms

Apply these classifications to materials used in the construction industry

Understand the significance of defects in materials

Understand meaning of, and methods of testing for, physical and mechanical properties of materials

Teaching and Learning Methods

Lectures, Tutorials and practicals

Method of Assessment

Examination  75%

Assignments  25%

Reading List
Description of Study-Unit

CVE1632 Introduction to Data Management 3 ECTS

Study-Unit Aims

To introduce concepts of sample characteristics, including mean, variance, coefficient of skewness, coefficient of variation, standardized variables.

To introduce techniques for data collection, for data analyses and synthesis, as used in structural and civil engineering, and in planning and social sciences.

To introduce techniques for sampling technical data, and handling technical information, including use of information technology

To introduce concepts of geographic data

Learning Outcomes

Ability to understand basic statistical methods used in civil engineering, including normal (Gaussian) and log-normal distribution, estimation of fractiles, and normality tests.

Ability to design experiments, handle experimental data, assess significance of variations, and errors.

Ability to understand how to characterize the properties of a population of data using information derived from random variables, and develop models to predict behavior of the physical world.

Ability to understand concepts used in the characterisation of actions, of material properties, and of geometrical data, and tolerances and quality control processes.

Ability to apply concepts of reliability differentiation to structural and civil engineering.

Ability to use statistical functions in simple commercial software

Teaching and Learning Methods

Lectures and tutorials

Method of Assessment

Examination (with re-sit)

Reading List
Description of Study-Unit

EVD1502   Environmental Design of Interior Spaces   4 ECTS

Study-Unit Aims

The aim of this course is to introduce the importance of integrating environmental design criteria within building design.

The unit will be organized as follows:

1. **Design for thermal comfort**: The building fabric and the consumption of energy as means of modifying the thermal environment within buildings. The design of the building fabric to achieve thermal comfort within minimum expenditure of energy. The effects of orientation, surface area to volume ratios, areas of glazing, infiltration and ventilation are considered.
3. **Daylighting**: The importance of daylighting in buildings. Daylight and sunlight prediction.
4. **Artificial lighting**: Interior lighting design criteria. Light sources and fittings. Basic computation of artificial lighting levels within buildings.
6. **Room acoustics**: The application of the basic concepts of room acoustics to the design of spaces used primarily for speech or for the performance of music.

Learning Outcomes

- Ability to identify the sources of energy gains and losses in buildings and apply this knowledge to the design of buildings to ensure low energy use in the building;
- Ability to understand the role of day-lighting in building and be able to make predictions on the availability of day-lighting within specific environments;
- Ability to make judicious selection of lighting equipment and sources in the design of building interiors and predict the levels of lighting within the building;
- Ability to understand the criteria used in the assessment of noise annoyance, from internal and external sources and apply this information in the design of buildings.

Teaching and Learning Methods

Lectures and laboratory and on-site practicals

Method of Assessment

<table>
<thead>
<tr>
<th>Examination</th>
<th>75%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pracitcals</td>
<td>25%</td>
</tr>
</tbody>
</table>

Reading List
Description of Study-Unit

CNM1412  Building Elements 1  4 ECTS

Study-Unit Aims

The aim of this unit is the study of the processes by which a building is produced. The course introduces the types and roles of the primary elements of a building including foundations, walls, roofs and floors. The functional requirements of the various elements are discussed. The appropriate selection of materials, construction forms and methods as related to the functional performance are considered. Examples of simple construction details of primary elements are indicated. The course will also introduce sources of information, and a description of the basic elements of contract documents, including a plan of work, specifications and the preparation of working drawings.

The unit will be organized as follows:

1. Introduction: The building process is described with a consideration of the functions of buildings and the effects of technological developments on the way buildings are produced. Technological factors which have an effect on the performance of building elements including dimensional co-ordination, methods of jointing, tolerances and inaccuracies.
2. Information and communication: Sources of information. The plan of work and the preparation of contract documents (brief introduction only). The preparation of working drawings.
5. The relation between external levels and indoor levels: The types and design of ground floors. Accessibility.

Learning Outcomes

Ability to identify the primary elements of a building and the functional performance of each element;

Ability to find suitable sources of information and make judicious decisions on the most appropriate selection of materials and methods;

Ability to identify an appropriate construction system for a particular situation, select the proper materials, and the construction form and method.

Ability to prepare simple construction details of these elements.
Teaching and Learning Methods

Lectures

Method of Assessment

Examination 75% (with re-sit)
Assignments 25%

Reading List


Description of Study-Unit

CVE1612  Structures 1  4 ECTS

Study-Unit Aims

To introduce principles of stress and strain at a point within a structural material, including the determination of the principal stresses and strains.

To introduce basic concepts of constitutive stress-strain relationships for different structural materials.

To introduce basic concepts of equilibrium of forces and compatibility of displacements within structural systems.

To introduce basic concepts of elastic material physical constants and strain energy principles.

To introduce the principles of simple elastic theory of bending for homogenous and composite beams with asymmetric, mono-symmetric, bi-symmetric and rotationally-symmetric cross-sections.

To introduce the principles of elementary plastic bending behaviour.

To introduce basic concepts of simple torsion theory and the behaviour of structural members under combined loading.

Learning Outcomes

Ability to assess and determine the two-dimensional state of stress and strain at a point within a structural material.

Ability to apply the concepts of equilibrium of forces and compatibility of displacements for the solution of simple structural problems.

Ability to determine the maximum tensile and compressive bending stresses as well as the maximum shear stress within a cross-section of a structural beam member under flexural loading.

Ability to determine the maximum plastic moment of resistance of simple beam cross-sections.

Teaching and Learning Methods

Lectures and tutorials

Method of Assessment

Examination  90% (with re-sit)
Coursework    10%

Reading List
Third Semester

Description of Study-Unit

BEN2101   Design Workshop 3   6 ECTS

Study-Unit Aims

This study-unit consists of a series of projects, which will be carried out in a design studio environment, dealing with building components and spaces, and which are intended to progressively develop the student’s ability to organize the plan of a simple construction, and to design and incorporate in such plan a variety of building components. The aim of this series of projects is ultimately to ensure that students can understand the technical requirements of a simple construction, and can design simple buildings, incorporating all such requirements. Typical projects will include small terraced or detached residential units, studio apartments, small public utility buildings such as sanitary facilities, clinic or child care facilities. The project focus will include spatial organization, space relationships, building/site relationships, but also the way building components can be assembled together to create a construction.

Learning Outcomes

Ability to effectively synthesize building components into a compact plan of a simple building or an identified area of a larger building.
Ability to understand and apply the principles of spatial organization and relationships between different components of a building.
Ability to understand, and incorporate, the requirements for barrier-free access, in the design of spatial components of buildings.
Ability to understand the relationship between a building and its site and effectively locate a building taking into consideration topography, views, wind, sun, vegetation and other site specific elements.
Awareness of the impact of environmental issues on the form and appearance of buildings and ability to identify various passive energy technologies that can be incorporated in buildings, and to manipulate such incorporation of passive technologies to achieve desired outcomes.

Teaching and Learning Methods

Studio presentation sessions, studio work, tutorials, project work

Method of Assessment

Portfolio (with re-presentation of work, if unsatisfactory)

Reading List

Various architectural journals and reference books will be indicated during the course.
Design Like You Give a Damn, ed. Architecture for Humanity, Thames & Hudson, 2006
Barrier-Free Design: Principles, Planning, Examples, Heiss, Degenhart & Ebe, Edition Detail, Birkhauser
Description of Study-Unit

AUD2211   Studies in Maltese Architecture       4 ECTS

Study-Unit Aims

The aim of this course is to familiarize the student with the multi-faceted historical aspects of his immediate surroundings, presented in a holistic manner which will integrate current knowledge about the principal socio-political, economic, religious and cultural events that have produced modern Malta. The course will present a comprehensive picture of architectural developments in the Maltese islands placed in its wider Mediterranean context, covering, amongst other things, Malta in prehistory, The Roman town of Melite, Medieval relics and vernacular manifestations, the emergence of Fortress Malta and the building of Valletta, Baroque Malta, the nineteenth century, and the twentieth century.

Learning Outcomes

Ability to differentiate the different periods of building in the Maltese Islands, and to place these developments in the context of developments in Europe and elsewhere.

Ability to recognize the cultural significance of a number of key buildings and urban groups in Malta and Gozo.

Ability to understand current building and urban forms, as well as stylistic development, in the context of the wider socio-cultural history of the Maltese Islands.

Teaching and Learning Methods

Lectures, seminars and audio-visual presentations

Method of Assessment

Examination    60%   (with re-sit)
Presentations  40%

Reading List

Architecture in Malta in Malta, De Lucca, D., in “Roots of a Nation: The development of Malta from an island people to an island Nation”, ed. K Gambin, Malta: Midsea Books, 2004
Baroque Architecture in Malta, De Lucca, D., in Fourth Centenary - University of Malta “Collected Papers” (Malta: University of Malta, 1992)
5000 years of architecture in Malta, Mahoney, L., Malta: Valletta Publishing, 1996

Description of Study-Unit

CNM2411  Building Elements 2  4 ECTS

Study-Unit Aims

The aim of this study-unit is a continuation of the study of the processes by which a building is produced. The study unit focuses on the types and roles of the secondary elements of a building including internal subdivisions of space, internal and external openings, circulation elements, finishing of internal surfaces. The process adopted will be similar to that in the previous study unit: the functional requirements of the various elements are identified and the materials, construction forms and methods selected. Examples of simple construction details of secondary elements are indicated.

The unit will be organized as follows:
1. Internal subdivision of spaces: Methods for the internal subdivision of spaces are described including types of intermediate floors and internal partitions.
2. Internal circulation: The concept of internal circulation is discussed to include the design of stairs and stairwells, lift shafts, etc.
3. External and internal openings: A study of the technology of window and door design and construction with special reference to the environmental impacts on internal spaces of the design of these elements.
4. Internal finishes: A description based on functional requirements of internal finishes to buildings including finishes to walls, floors and ceilings.
5. Safety in use: A brief introduction to the concepts of safety in use in buildings including fire safety, primary and secondary safety considerations in the design of building elements, the needs of persons with special needs including the needs of young children and the elderly.

Learning Outcomes

Ability to identify the secondary elements of a building and the functional performance of each element;

Ability to make judicious decisions on the most appropriate selection of materials and methods;

Ability to identify an appropriate construction system for a particular situation, select the proper materials, and the construction form and method.

Ability to prepare simple construction details of these elements.
Teaching and Learning Methods

Lectures

Method of Assessment

Examination 75% (with re-sit)
Assignments 25%

Reading List


Description of Study-Unit

CNM2421  Materials for Construction 1  4 ECTS

Study-Unit Aims

The objectives of this study-unit is to introduce the major materials used in the local construction industry, namely stone and concrete block, in-situ and precast concrete, iron and steel, and timber. The review of construction materials will include sources, methods of extraction, production and manufacture, and an introduction to the main properties as relevant to the construction industry, including long-term behavior.

Learning Outcomes

Ability to select main construction materials in accordance with their physical and mechanical properties.

Ability to understand the influence of techniques of extraction, production and manufacture on the main properties of these construction materials.

Ability to understand the nomenclature used when describing these main construction materials, and their properties.

Ability to carry out simple tests to verify basic physical and mechanical properties.

Ability to predict the general long-term behavior of these materials.

Ability to draft main specification requirements for these construction materials.

Teaching and Learning Methods

Lectures, laboratory sessions and site visits

Method of Assessment

Examination  75%  (with re-sit)
Assignments  25%

Reading List

Concrete, A.M.Neville, Fourth and Final edition, 1996
Concrete, Peck (ed.), Edition Detail, Birkhauser, 2006

Description of Study-Unit

EVD2501 Environmental Control Systems 4 ECTS

This study unit is concerned with the design and control of the environment. Three aspects of environmental control systems, or building services, are considered:

(a) Mechanical services including transportation systems, heat, cooling and ventilation systems, fire detection and sprinkler systems.
(b) Electrical services including electricity power supply and distribution and lightning protection;
(c) Piped services including cold and hot water supply, sanitary services and fittings, foul water and surface water drainage;

Study-Unit Aims

The aim of this unit is to provide:

(a) A basic understanding of the role of services in controlling the environment within buildings;
(b) The ability to communicate effectively with building services engineers in the design and installation of building services;
(c) A sound basic knowledge of building services as a basis for further studies for those students who may wish to specialize in environmental control systems, their design and installation.

Learning Outcomes

Ability to treat the provision of building services as an integral part of the design and construction of a building.

Ability to indicate the requirements for the provision of building services within a proposed building;

Ability to understand the importance of proper design of building services in the design of a successful building, including its amenity value, health & comfort issues and energy efficiency, associated with such services installed.
Skills

At the end of this course, a student should have at his disposal the skill to consider the provision of proper building services in the design of a building. The quantitative aspect of this design will not be covered at this stage.

Teaching and Learning Methods

Lectures and assignments

Method of Assessment

Examination  80% (with re-sit)
Assignments  20%

Reading List

Burberry, P., Environment and services, latest editions. (Mitchell's building series)
Chartered Institution of Building Services Engineers, CIBSE Guides
Hassan, George Building Services, ISBN 0333537041
Description of Study-Unit

CVE2611 Structural Design 1 4 ECTS

Study-Unit Aims

The objective of this study-unit is to introduce students to the structural design of simply-supported and continuous flexural elements, such as reinforced concrete beams and slabs, and steel beams. The course will introduce statically determinate structures, and simple bending theory. It will outline current limit state approaches to structural design, and to Eurocodes, including the basis of design and actions. The course will address the ultimate and serviceability limit state design of reinforced concrete flexural elements, such as rectangular and flanged beams and slabs, as well as of simple structural steel flexural elements.

Learning Outcomes

Ability to identify functional behavior of flexural structural elements in simple buildings.

Ability to assess actions on such elements, in accordance with statutory standards.

Ability to calculate bending moments, shearing forces and deflections of simple determinate structures.

Ability to design and detail reinforced concrete beams and slabs.

Ability to design and detail simple steel beams and girders

Teaching and Learning Methods

Lectures and assignments

Method of Assessment

Examination 80% (with re-sit)
Assignments 20%

Reading List

Design of Structural Elements, Arya, C., Spon, 2004
Description of Study-Unit

CNM2801  Introduction to Project Management        4 ECTS

Study-Unit Aims

The objective of this study-unit is to introduce students to project life-cycles, and the different types of procurement systems for design and construction services and their impact on project structures. The procurement routes set the scenario for the planning and control of project performance parameters, namely time, cost and quality. The study-unit also introduces the tools and techniques employed in the management of these performance parameters.

The aims of this study-unit are:
1. to introduce students to the concept of projects and project life cycles;
2. to explain different procurement routes for construction projects, and their impact on project structures;
3. to present project performance indicators of time, cost and quality, and the manner by which they can be managed;
4. the application of project management techniques to construction related projects.

Learning Outcomes

Ability to list and explain the characteristics of different procurement systems.

Ability to analyze procurement routes and illustrate the fundamental strategic differences between procurement systems when applied in a project setting.

Ability to explain how cost, time, and quality are related in a construction project.

Ability to produce time and cost planning models for a given construction project.

Ability to present a quality plan for a given construction project.

Skills

By the end of the study-unit, a student will be able to:

Describe the far-reaching impacts of initial strategic decisions regarding procurement in a construction context.

Distinguish, given a project scenario, that the different project contexts require different project management solutions.

Produce a project a management proposal, including time, cost and quality plans.

Teaching and Learning Methods

Lectures and seminar
Method of Assessment
Examination  75% (with re-sit)
Assignments  25%

Reading List

*Building Procurement Systems*, James Franks, (0 582 31926-9)
*Management of Procurement*, Denise Bower, (0 7277 3221 8)
*Introduction to Building Procurement Systems*, Jack Mastermann (0 415 24642 3)
*Procurement of Built Assets*, Duncan Cartlidge (0 7506 5819 3)
*Best Practice for Tendering for Design and Build Projects*, Griffith et al. (0 7277 3218 8)
*Constructors’ Key Guide to PFI*, Construction Industry Council, (0 7277 2662 5)
*Modern Construction Management*, Harris, McCaffer and Edum-Fotwe
*Construction Management: Emerging Trends and Technologies*, Trefor Williams
*Construction Management: Principles and Practice*, Alan Griffith